

# *THOR 7 DELIVERS HIGH PERFORMANCE AND RELIABILITY DESIGNED FOR MOBILITY APPLICATIONS*

Demand for reliable connections continues to grow rapidly due to the increased use of IP applications such as Broadband internet access, VOIP, videostreaming, email and improved access to corporate networks, so that those at sea can stay in touch with business operations, as well as to improve the quality of life for crew working aboard offshore vessels.

THOR 7, Telenor's first ever Ka band satellite provides regional coverage with a favourable look angle over

the main European shipping lanes. Utilising relatively small spot beams, THOR 7 provides unprecedented high powered performance for maritime applications.

Jan Hetland and Julian Crudge, both of whom have been instrumental in supporting the commercial realisation of THOR 7's Ka band services, share with us the journey so far as well as the futures goals and ambitions for THOR 7.



Julian Crudge, Data Communications  
Divisional Director Telenor Satellite

**Julian Crudge, Data Communications Divisional Director at Telenor Satellite, discusses demand, reliability and surpassing expected performance levels for Ka band services.**

**Can you begin by telling me about demand for maritime VSAT, how it is transforming the sector and how THOR 7 fits into the future of communications at sea?**

We recognised that the demand for maritime VSAT is increasing at a rapid rate. If you look at what's happening to you as a user with Wi-Fi at home, with broadband, mobile phones, 4G and 5G you realise that you need more connectivity in order to do the things that you do. You also recognise that you want to take this connectivity with you, no matter where you are – even at sea. That's why we designed THOR 7 specifically for the maritime marketplace, to meet this demand for broadband connectivity.

We started to design the satellite in 2008/9 so it has taken up until its launch in 2015 to become operational. It's been a long gestation period. Broadband demand at sea is booming, as people are used to accessing their regular apps such as Facebook, uploading pictures and YouTube and Skype everywhere they go. The demand for cruise connectivity is huge, let alone commercial applications. THOR 7 provides this high quality connectivity at sea which is in such high demand.

**What has the testing experience been like?**

We have been testing the iDirect Velocity platform since August last year so it's taken from then until now to get the whole thing fully operational and to a standard for commercial service. We've put a huge amount of work into this and had a huge amount of learning to do. We had 18 test customers (30-50 vessels) on board. Some were high bandwidth and higher speed vessels that were going through all the beams in different weather conditions using different applications. It has been important to literally test everything. For example, a cruise ship doesn't move a great deal, but a fishing vessel moves around a lot on the waves and you get beam blockages. All of the testing has given us and our customers a lot of experience and confidence in the platform. We were not prepared

to launch until we were happy that it worked as least as well as our existing service on Ku-band.

We already have an Antarctic service on the satellite. There is a beam over the Antarctic which is backhauling traffic in Ka-band and is a good test of the technology. Our customer in Antarctica says it is the best service they have ever had. It has been designed specifically for them, and they are very happy with it.

We have had an absolute focus on quality to ensure that the service works perfectly before launch. This is why this has taken as long as it has.

**Which users comprise THOR 7's addressable market?**

We are a regional satellite provider so it is regional traffic that we will focus upon. This includes anything from ferries (a big market for us in the Mediterranean, Greek Islands, Barcelona, Ibiza, North Sea, and Baltics), windfarm supply vessels, oil and gas supply vessels, super yachts, and other regional and commercial shipping. We will be targeting new builds that have not already got an antenna and also companies that have large ships or large bandwidth requirements or generally more specialised applications such as super yachts that can afford to put a new antenna on board.

**How has the actual performance of the satellite measured up against initial expectations?**

As always with satellites, THOR 7 has performed much better than expected. The other important thing to note is that the limitation today is in the modem technology, which needs more development. In terms of the power, the satellite can handle higher MODCODs which aren't yet available on TDMA systems, but that will come through in the next couple of years. Eventually, increasingly higher bandwidth will be accessible as the technology improves.

The other important point to stress is that of rain fade. We have ALC (Automatic Level Control) on the satellite, we have Adaptive TDMA (Time Division Multiple Access) on the inbound, we have ACM (Adaptive Coding and Modulation) on the outbound and we have a diversity antenna. All of that means that we have had absolutely no problem with rain fade whatsoever.



## Q&A with Jan Hetland, Data Communications Product and Services Director, Telenor Satellite

**Jan Hetland, Data Communications Product and Services Director at Telenor Satellite, explains to us the testing phases involved in getting THOR 7 ready for commercial service.**

**Can you tell me about the journey you have been on from the launch of THOR 7 to the commercial launch of its maritime service?**

It really has been all about testing, testing, testing and more testing. After the satellite launched in April 2015, the spacecraft went through an in-orbit test phase lasting roughly six weeks. Testing ended in mid-June 2015. Immediately afterwards, we started on our Alpha test phase where we checked out the various pieces of infrastructure required to complete the service. This included including testing of the antenna, backhaul connectivity and the service platforms until we were satisfied with the integrity and functioning of the overall infrastructure. In the September, we started BETA testing. We have been very reliant upon our BETA customers who have helped us to complete this important phase and that showed interest in trialling the new service. We have had a few terminals under our direct control, but we wouldn't have been able to exercise them across our coverage area and verify performance in all parts of the footprint. They have done a tremendous job for us.

**Can you give more details on the Beta testing, what it entailed and the types of vessels and requirements that were involved?**

Early on in the BETA testing, we discovered there were software issues that needed to be fixed and with our supplier, iDirect, we diligently prioritised issues and attacked the most critical ones first. Through working closely with iDirect, we have learned more about the platform and the real life challenges that you are exposed to when the system actually is placed into operation. We started to see some really good results back in February/March of this year as things started to come together. At that point we were starting to fix more things than we discovered. It was really all about getting over that hurdle.

**What have been the highlights of the testing, and what has been achieved in the last few weeks and months?**

One of the most notable achievements, and this happened quite early on, was when we benchmarked the performance that we could get out of the platform. Even for the smallest antennas we were reaching download speeds of 70Mbps and upload speeds of 7Mbps. To us, that was a fantastic achievement and way beyond what we are able to do on our current Ku-band services. It really verified not just the satellite design, but the overall concept. We realised we had done something very right!

**Now that the maritime service has launched, what are your future goals and ambitions for THOR 7?**

Our short-term ambition is to turn as many as possible of our BETA test customers into regular commercial customers. We expect to ramp up the volume of business quite quickly now. We are also entering the summer season and this industry is quite seasonal, especially in terms of cruise and luxury yachts. We are very happy that we have come to market now. If we had launched three months later, we would have missed this year.